

Comments on the Feasibility Study
Prepared by Geo-Hydro Inc. on behalf of
People in Need of Environmental Safety
December 26, 2012

Geo-Hydro Inc. (GHI) is submitting the following comments on the Feasibility Study (FS) for the Pines Area of Investigation dated November 2012, on behalf of People In Need of Environmental Safety (PINES). Our general and specific comments on that document are provided below. Additional comments on the radiological characterization of CCBs in the study area provided by Mr. Larry Jensen, a Health Physicist and member of PINES, are provided in the Appendix. The comments identify the most significant technical issues associated with the FS. GHI and Mr. Jensen will address issues with the FS and prior documents with PINES as the Remedial Investigation/Feasibility Study (RI/FS) process continues and concludes, thereby allowing PINES to fulfill its obligations to the public under the TAP.

General Comments

Adequate long-term reduction and minimization of leachate formation at the source will be critical to successful protection of human health and the environment. Unlike organic-rich wastes that are commonly disposed in landfills, coal combustion byproducts (CCBs) are primarily composed of inorganic materials that do not biodegrade in a landfill cell. Water that infiltrates vertically or laterally into the waste dissolves contaminants and creates CCB-contaminated leachate as long as leachable constituents remain in the waste. Modeling conducted in support of the USEPA Coal Combustion Waste Risk Assessment showed that arrival times of the peak concentration at receptor wells located in the vicinity of CCB landfills are on the order of hundreds to thousands of years (USEPA, 2010). The remedy selected for Yard 520 must be capable of controlling formation and migration of CCB leachate over a time period substantially longer than the 30 years of operation and maintenance assumed in the FS. Alternatives that include physical containment of the source materials should be preferred over active systems that will require significant operation and maintenance over an extended (essentially perpetual) period of time.

GHI notes that none of the remedial alternatives discussed in the FS include measures to control infiltration of precipitation through the existing soil landfill cover and CCB. Each of the alternatives retained in the FS claims the existing “clayey soil cover¹” as a component of remedy and count the cost of placing the final cover as a response cost rather than as an element of landfill closure required

¹ The remedial investigation report describes the existing cap as “a vegetated clayey soil cover” on page 3-6, section 3.4.2, 2nd paragraph. This is consistent with what is required by 329 IAC 10-30-3.

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by the Indiana Department of Environmental Protection (IDEM) landfill permit. Even if we assume that the closure of Yard 520 was somehow a legitimate response item, the landfill still needs a functioning cap to prevent infiltration into the waste. The inadequacy of the existing soil cap was documented during the Remedial Investigation (RI) in piezometer PZ001 where a leachate mound and rising heads were observed during the time that field sampling was being conducted. It remains unknown whether the leachate head within the landfill is continuing to rise or has since stabilized since PZ001 was immediately abandoned by the respondents upon completion of the RI. What is known is that the existing clayey soil cover is not functioning as an adequate barrier to infiltration. Infiltration of precipitation through the soil cap drives leachate formation. Mounding of leachate with the landfill provides the head that drives migration of leachate away from Yard 520. Controlling infiltration of precipitation into and through the CCB must be a critical part of any long-term remedy for Yard 520.

The FS also claims of decreasing concentrations of CCB-derived constituents in groundwater. The monitoring reports provided in Appendix C should be carefully reviewed to understand the information that they actually provide. The respondents' own reports identify more statistically significant upward than downward trends, and these do not include wells that show upward trends deemed not 'statistically significant' while documenting that concentrations have more than doubled in some cases. The IDEM administered monitoring program at Yard 520 needs significant revision to reflect known conditions at the site.

Specific Comments

1. Page 1-2, Section 1.3, 3rd paragraph - The landfill was required to properly close Yard 520 under their operating permit issued by IDEM, not as part of a CERCLA response action. Closure of Yard 520 was a known condition of the landfill permit and costs for doing so should not be counted as response action costs.
2. Page 2-2, Section 2.2 – GHI has previously provided extensive comments on the RI to the United States Environmental Protection Agency (USEPA) on behalf of PINES. We will not reiterate those comments again here, but all of our previously stated comments still apply.
3. Page 2-1, Section 2.1.1, 2nd paragraph – Contrary to what is stated in this paragraph, groundwater gradient reversal north of the Yard 520 landfill are not short-term and local and do affect overall groundwater flow. Significant mounded leachate within Yard 520 was identified during the remedial investigation (RI). The height of the mounding was still rising at the time monitoring ceased. The leachate mound reversed the groundwater flow gradient north of the landfill and causes CCW leachate to flow from Yard 520 toward the north, a complete and lasting reversal of any anticipated 'normal' flow direction. The northward groundwater gradient on the north side of Yard 520 will remain as long as precipitation is

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allowed to continue to infiltrate through the “clayey soil cover” presently atop the landfill surface. The mounded leachate condition will continue unless remedial actions are taken to remedy this situation.²

4. Page 2-2, Section 2.1.3, 3rd paragraph – This section states that the CCBs present in Yard 520 and the suspected CCBs within the Pines Area of Investigation are not the same materials. This assertion is unfounded. The extent and type(s) of CCBs in residential yards has not yet been adequately characterized. Investigation of the presence or absence of CCBs in residential yards has so far been made on the basis of samples collected from the upper 6-inches of soil. The types and extent of CCBs present below 6-inches remain uninvestigated. It is reasonable to believe that CCBs used as road base may have been predominantly coarse-grained, but the characteristics of CCBs in residential yards has yet to be determined.
5. Page 2-3, Section 2.2.1 – The visual inspection program was based on samples collected from the upper 6-inches of soil, an interval that necessarily would have been mixed or covered with topsoil in order to support vegetative growth. Results of this investigation are not necessarily representative of the CCB content or composition of materials located deeper in the soil profile (see comment #4). The statistical evaluation of CCB concentrations and exposure point concentrations presented in this section are based on a skewed sample population that may underestimate potential exposure to CCBs in the soil.
6. Page 2-8, Section 2.2.4, 1st full paragraph – The last sentence of this paragraph speculates that paving of roadways may reduce groundwater recharge and migration of CCB-related constituents to groundwater. This speculation is likely correct, but only for CCBs located directly beneath an impermeable pavement. The same affect from placing a true cap over the large deposits of CCBs in Yard 520 and other areas could be speculated. An appropriately performing cap (as opposed to the existing soil cover) over the large deposits of CCBs like Yard 520 must be included in any remedy that does not include waste removal in order to minimize leachate formation and reduce the existing head within Yard 520. The U.S. Corps of Engineers Hydrologic Evaluation of Landfill Performance (HELP) model is routinely employed to investigate landfill cap performance. HELP modeling should be performed to quantify the expected performance of the existing clayey soil cover relative to an upgraded landfill cap.
7. Page 2.8, Section 2.2.4, 2nd paragraph - The statement that, *...all groundwater containing CCB-derived constituents flows towards and into the Brown Ditch system, including its related tributaries and wetlands* conveniently obfuscates the fact that reversed groundwater

² The northward migration of leachate from Yard 520 is only one of the impacts of allowing the in-waste mounding to persist. Unpermitted discharges from the flanks of Yard 520 persist to the east, south, and west as well.

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gradients north of Yard 520 transport CCB-derived constituents below residential areas of Town of Pines prior to eventual discharge into wetlands areas of Indiana Dunes National Lakeshore (IDNL), not all of which are part of Brown Ditch drainage.

8. Page 2-8, Section 2.2.4, 3rd paragraph - This paragraph states, *based on the available information, CCB-derived constituents in groundwater do not extend northward into IDNL at levels of significance*. The paragraph also states, *CCB-derived constituents do not currently appear to extend to areas where private water wells are located outside the area currently supplied by municipal drinking water*. The location of the leading edge of CCB-derived contaminants in groundwater has not been determined (see comment #9). The statements do not acknowledge the long-term hazard evidenced by the increasing concentrations of CCB-derived constituents documented by semi-annual sampling of Yard 520 monitoring wells and reported to IDEM since completion of the RI. Increasing concentrations of CCB-derived constituents reported to IDEM were brought to the attention of USEPA by GHI in comments on the Development and Screening of Alternatives memorandum. Fully considered, “based on the available information,” the conditions that existed at the end of the RI are demonstrably neither worst case nor maximum extent of contamination. The CCB-derived contaminants will migrate with northward flowing groundwater thru residential areas and toward IDNL at increasing concentrations until Yard 520 CCBs are exhumed, the groundwater head within the landfill is reduced, or a permanent containment remedy is put in place.
9. Page 2-9, Section 2.2.4, 1st paragraph – This section of the FS presents boron concentrations from carefully selected monitoring wells located in areas well north of Yard 520 and suggests that relatively stable concentrations in these wells are an indication that CCB-related constituents do not extend to IDNL and are not migrating toward IDNL. The concentration of CCB-derived contaminants in a few wells says nothing about the location of the leading edge of the plume. Monitoring wells placed within contaminant plumes often show contaminant concentrations within a narrow range, even as the leading edge continues to migrate downgradient. Monitoring points located in front of the leading edge of a contaminant plume are necessary to determine how far a plume has advanced. Going unaddressed are increasing concentrations of CCB-derived contaminants that are observed in Yard 520 monitoring wells located near the north side of Yard 520. Increasing concentrations of CCB-derived constituents reported to IDEM were brought to the attention of USEPA by GHI in comments on the Development and Screening of Alternatives memorandum. The most recent data continues those observed trends. This is verified by results of water quality trend analyses included in Appendix C (see comment 17).

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10. Page 2-9, Section 2.2.4, 2nd paragraph – The driving head in the shallow groundwater system in the vicinity of Yard 520 is provided by the groundwater mound within the landfill. The mound showed increasing elevation during the limited period of observations of the RI. How high the hydraulic gradients in the vicinity of Yard 520 have become subsequent to the RI is unknown; PZ001 was abandoned immediately after completion of RI field work and before head levels had ceased rising. Failure to adequately document changes in the hydraulic gradient does not mean that there has been no significant change. The increases in CCB-derived contaminants documented in Yard 520 monitoring wells located north of the landfill argue that the gradient may be increasing yet.
11. Page 2-19, Section 2.3.4.2, 1st and 2nd full paragraphs – See comments #9 and #10.
12. Page 2-23, Section 2.4.3.2, 5th paragraph – See comments #8, #9, and #10.
13. Page 3-7, Section 3.3.1, 4th paragraph - Contrary to what is stated in this paragraph, Yard 520 is not in compliance with applicable IDEM regulations. The appropriate statement is that, against all evidence and reason, IDEM refuses to enforce its regulations at Yard 520. Closure requirements for Restricted Waste Sites Type I and Type II (329 IAC 10-30-1) contains a performance standard that states that owners shall close the facilities in a manner that *controls post-closure escape of waste, waste constituents, leachate, contaminated precipitation, or waste decomposition products to the ground or surface waters or the atmosphere*. Closure of Yard 520 has been unsuccessful in meeting this performance standard. Monitoring reports submitted to IDEM and included in Appendix C confirm that statistically significant increases in CCB-derived constituents continue to occur. The reports to IDEM have misrepresented the direction of groundwater flow in the immediate vicinity of Yard 520 and falsely attributed increasing CCB-derived contaminant levels to outside influences. That IDEM turns a blind eye to these conditions is not a valid argument of no problem. If it argues anything, it is that USEPA should question IDEM's determination or capability as the designated authority for RCRA.
14. Page 4-1, Section 4.1, last paragraph – Closure of Yard 520 was a required element of the IDEM-issued landfill permit, not a response action. The cost of placing final cover over the landfill should not be included in response cost calculations.
15. Page 4-4, Section 4.2 - This section provides descriptions of various reasons why the shallow sand aquifer in Town of Pines cannot possibly be usable for drinking water, ignoring the fact that the aquifer actually was used for water supply until releases of CCB-derived constituents contaminated the resource. In fact, the aquifer is still being successfully used as the drinking water source in areas of Town of Pines that are outside of the area where municipal water service has been extended. We suspect that the citizens of Town of Pines

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will be particularly outraged to learn that the aquifer upon which many have depended upon for generations and continue to depend were to be reclassified as unusable because of the respondent's quest to evade Remedial Action Objective (RAO) 3 and National Contingency Plan (NCP) expectation of groundwater restoration.

16. Page 4-5, Section 4.2 - RAO 3 sets the objective of restoring groundwater quality within a timeframe that is reasonable considering practicable response action alternatives. The suggestion that EPA consider something on the order of 205 years a reasonable timeframe for groundwater restoration does not qualify as a reasonable period, and still might not be long enough for CCB-derived groundwater impacts to disperse and groundwater quality to be restored unless the source is contained or removed. Unlike organic-rich wastes, coal combustion byproducts (CCBs) are primarily composed of inorganic materials that do not biodegrade. Water that infiltrates into the waste dissolves contaminants and creates CCB-contaminated leachate as long as leachable constituents remain in the waste. Modeling conducted in support of the USEPA Coal Combustion Waste Risk Assessment showed that arrival times of the peak concentration at receptor wells located in the vicinity of CCB landfills are on the order of hundreds to thousands of years (USEPA, 2010). Even this modeling oversimplifies the behavior of CCBs in the environment and the persistence of CCB-derived contaminants in the environment. As CCB materials weather, some contaminants are temporarily sequestered until those intermediate phases themselves weather and leach. Contaminants sequestered initially in glass phase become mobile long-term as glass devitrifies. There are several practical response action alternatives that, if implemented appropriately, would restore groundwater quality over a reasonable timeframe.
17. Page 4-10, Section 4.5.1.1 - Appendix C of the FS provides the April 2012 Yard 520 Post-Closure Monitoring Report. This report provides the results of long (entire record) and short-term (last 4 years) Mann-Kendall trend analysis that was performed on Yard 520 monitoring wells. The conclusions of this report state that long-term testing results identified a total of 70 statistically significant upward trends, 22 of these were at wells identified in the report as 'upgradient' monitoring wells. A total of 66 statistically significant downward trends were identified in long-term testing. Short-term testing identified a total of 26 statistically significant upward trends, 8 of these at 'upgradient' wells. These results do not include concentration trends that have more than doubled in some cases that are deemed 'not statistically significant.'

Of course, it is known that the wells designated in the Yard 520 groundwater monitoring report as 'upgradient' wells are actually hydraulically downgradient of the Yard 520 groundwater mound documented in the RI report. Monitoring reports submitted to IDEM during the RI acknowledged the existence of mounded leachate and mapped the wells as

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downgradient. Those submitted since PZ001 was removed have inaccurately identified a reversed direction of groundwater flow in areas north of Yard 520, as if the mounded leachate had mysteriously disappeared. Why IDEM continues to accept monitoring reports showing these issues without requiring major modifications to the monitoring program is unclear but should be of concern to USEPA.

The statistical trends identified in the monitoring report serve as an independent statistical verification of increasing concentrations of CCB-derived contaminants in groundwater north of Yard 520. These contaminants will continue to migrate with northward flowing groundwater thru residential areas and toward IDNL unless the leachate head within the landfill is reduced, waste is exhumed, or a permanent groundwater containment remedy is put in place.

18. Page 4-11, Section 4.5.1.1, last bullet – Compliance monitoring wells located around the perimeter of Yard 520 monitor quality of groundwater that is migrating from Yard 520 to offsite locations. Remedies selected for implementation in the FS must address water quality at these locations in order to restore groundwater quality as specified in RAO 3.
19. Page 4-12, Section 4.5.1.2, 2nd paragraph – The concentration of CCB-derived contaminants in a few wells says nothing about the location of the leading edge of the plume. Monitoring wells located within contaminant plumes often show contaminant concentrations within a narrow and stable range even as the leading edge continues to expand downgradient. Monitoring points located in front of the leading edge of a contaminant plume are necessary to determine how far a plume has advanced and whether downgradient plume growth is occurring. Effective mitigation of the leachate mound within Yard 520, the driving head responsible for reversing groundwater flow and driving contaminants toward the north, is needed to restore groundwater quality (RAO 3) and protect IDNL (RAO 6).
20. Page 5-1, Section 5, 1st bullet – 329 IAC 10-30-3 requires owners and operators of Type II Restricted Waste Landfills, such as North Yard 520, to apply and compact final cover of not less than two-feet as part of normal closure activities. The respondents closed Yard 520 in conformance with 329 IAC 10-30-3 by placing a “clayey soil cover” over the waste. There is a distinct difference between clayey soil cover and an engineered cap that is capable of minimizing infiltration into the underlying waste. The respondents themselves recognize this distinction in Section 6.1.1 and in Table 12. Increasing leachate head within the Type II landfill observed during the RI verifies that the clayey soil cover is not performing as an engineered cap. Costs associated with closure of Yard 520 required by normal closure regulations are not response costs and must not be allowed response action costs.

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21. Page 6-4, Section 6.2, last paragraph - Closure of Yard 520 was not a remedial action and closure cost cannot be counted as response costs (see comment #20).
22. Page 6-4, Section 6.3, 1st paragraph – Remedial actions for soil must be identified and retained until the results of additional soil sampling in residential areas has been completed and the need for soil remediation determined.
23. Page 6-5, Section 6.3.1, 1st bullet – See comments #21 and 22.
24. Page 6-5, Section 6.3.2, Containment - Containment alternatives must include construction of an engineered cap over Yard 520 that is capable of minimizing infiltration of precipitation into the waste and reduce the head of mounded leachate within the waste. See comments #20 and 21.
25. Page 7-1, Section 7.1 –Yard 520 must also be considered for remediation. The clayey soil cover that was placed over the waste as part of landfill closure has been shown ineffective at controlling infiltration of precipitation and thereby ineffective at controlling migration outward from Yard 520. Mounding of leachate within the landfill provides the head that drives migration of CCB-derived contaminants away from the landfill and toward the neighborhoods and IDNL. In the long term, infiltration and resultant leachate mounding must be controlled in order to restore groundwater quality as specified in RAO 3.
26. Page 7-2, Section 7.1.1 – Remedial alternatives for soil must be developed and retained until such time that additional sampling determines that remediation or deposits of CCBs and/or impacted soils is or is not required. Retained alternatives must, at a minimum, include technologies such as excavation and disposal, or capping of CCB-impacted soil.
27. Page 7-2, Section 7.1.2 - None of the remedial alternatives discussed in this section of the FS includes measures to control infiltration of precipitation through the existing soil landfill cover and, therefore, landfilled CCB. Each of the alternatives retained in the FS claims the existing clayey soil cover as a component of remedy and count the cost of placing the final cover as a response cost rather than as an element of landfill closure required by the IDEM landfill permit. Even if we assume that the closure of Yard 520 was somehow a legitimate response item, the landfill still needs a functioning cap to prevent infiltration into the waste, something the existing cap demonstrably does not do. The inadequacy of the existing soil cap was documented during the Remedial Investigation (RI) in piezometer PZ001 where a leachate mound and rising heads were observed during the time that field sampling was being conducted. It remains unknown whether the leachate head within the landfill is continuing to rise or has since stabilized since PZ001 was immediately abandoned by the respondents upon completion of the RI. There is no question, however, that the mound still persists; migration

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continues to worsen water quality to the north and leaking from the landfill continues to the east, south, and west. It is known that the existing clayey soil cover is not functioning as an adequate barrier to infiltration. Infiltration of precipitation through the soil cap drives leachate formation. Mounding of leachate with the landfill provides the head that drives migration of leachate away from Yard 520. Controlling infiltration of precipitation into and through the CCB must be a critical part of any long-term remedy for Yard 520.

28. Page 7-2, Section 7.1.2 – Each of the retained groundwater alternatives include a monitoring component claimed to be in accordance with IDEM requirements that is unambiguously inadequate. The groundwater monitoring program for Yard 520 must be modified to accurately reflect the direction of groundwater flow, monitor the elevation of mounded leachate within Yard 520, and provide comparisons to upgradient wells that are not themselves impacted by leachate migrating from the landfill. Additional monitoring locations are needed to document the current extent of the plume and provide evidence of the rate of expansion of the plume until it is at least stabilized. Additional monitoring points may be necessary to characterize releases from other CCB source areas (RAO 5) and to detect migration of the leading edge of the contaminant plume in the direction of IDNL (RAO 6).
29. Page 7-2, Section 7.1.2 – CCBs are primarily composed of inorganic materials that do not biodegrade in a landfill. Water that infiltrates vertically or laterally into the waste dissolves contaminants and creates CCB-contaminated leachate as long as leachable constituents remain in the waste, including those temporarily sequestered in intermediate weathering phases and glass phase that has yet to devitrify. Modeling conducted in support of the USEPA Coal Combustion Waste Risk Assessment showed that arrival times of the peak concentration at receptor wells located in the vicinity of CCB landfills are on the order of hundreds to thousands of years (USEPA, 2010). Any remedy selected for Yard 520 must be capable of controlling formation and migration of CCB leachate over a time period substantially longer than the 30 years of operation and maintenance assumed in the FS alternatives. Passive containment systems requiring minimal active operation and maintenance should be preferred over more active options due to the time-frame over which contaminants will be released from CCBs left in place.
30. Page 8-4, Section 8.3.1, Soil Alternative 1 – No Further Action on soil is predicated on the as yet unsubstantiated belief that there are no residential areas of Town of Pines that contain significant concentrations of CCBs near the ground surface that require remediation. Additional soil sampling is expected to be conducted to verify whether or not this belief is correct. In the mean time, remedial alternatives for soil should be developed and retained.

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31. Page 8-5, Section 8.3.2, Groundwater Alternative 1A – No Further Action is simply that, nothing would be done to contain CCB-derived contaminants to Yard 520 or restore groundwater quality. Under this scenario a functioning landfill cap would never be installed, mounded leachate will continue to drive CCB-derived contaminants away from the landfill, contaminant levels will continue to increase near the landfill, and contaminated groundwater will migrate toward residential areas and IDNL.
32. Page 8-7, Section 8.3.3, Groundwater Alternative 1B – No Further Action + Monitoring Upgradient of IDNL is essentially a do nothing approach with the addition of additional monitoring that, given the known releases from an IDEM permitted facility, should have already been required of the operators of Yard 520 by the State.
33. Page 8-7, Section 8.3.4, Groundwater Alternative 2 – Land use controls and deed restrictions are not treatment alternatives and have no ability to reduce toxicity, mobility, or volume of contaminants. Short-term land use controls may be a necessary action used to assure public safety and satisfy RAO 2 while actual remedial systems are in the process of restoring groundwater quality. Permanent land use controls or deed restrictions on residential properties will impose the burden property devaluation on impacted citizens for the benefit of the respondents.
34. Page 8-11, Section 8.3.5, Groundwater Alternative 3 - Monitored Natural Attenuation (MNA) could be a cost effective secondary method to deal with remnant contaminants in groundwater located outside of containment structures of facilities, were such containment implemented. Given the inorganic nature of CCB's and the very long timeframes over which leaching occurs, use of MNA as a primary alternative would fail to meet the reasonable timeframe requirements of RAO 3.
35. Page 8-14, Section 8.3.6, Groundwater Alternative 4 - Phytoremediation could be a cost effective secondary method to deal with remnant contaminants in groundwater located outside of containment structures or facilities, were such containment implemented. Given the inorganic nature of CCB's and the very long timeframes over which leaching will occur, use of phytoremediation as a primary alternative would fail to meet the reasonable timeframe requirements of RAO 3.
36. Page 8-17, Section 8.3.7, Groundwater Alternative 5A - The Barrier Wall–Full alternative merits close examination as a remediation alternative, however, it must be combined with an upgrade of the final landfill cover that has been placed on the landfill. An engineered landfill cap that minimizes infiltration of water into the landfill is a necessary component of any meaningful remedy. Without an upgraded cap the leachate level within the landfill will overtop the barrier wall once collection and treatment of leachate from the French drain

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collector is terminated. Management of water within the wall boundaries is acknowledged as an issue in subsection 8.3.7.4, but an upgrade from final landfill cover to a functional cap was not suggested. It seems as if the Respondents are intent on pretending that the clayey soil final cover that was placed over the waste during closure is equivalent to an actual landfill cap.

37. Page 8-21, Section 8.3.8, Groundwater Alternative 5B – The Barrier Wall- Partial alternative is subject to all of the same comments as the full barrier wall (see comment #36) with the additional caveat that this alternative would likely do little to restore groundwater quality to the north or west of Yard 520. The effectiveness of this alternative would be much less than the full barrier. The only apparent value to this alternative appears to be a lower construction cost.
38. Page 8-24, Section 8.3.9, Groundwater Alternative 6A - Groundwater Interception-North & East could be effective at capturing contaminants on the north and east sides of Yard 520 as long as the extraction and treatment systems are properly operated and maintained. What if any affect these systems might have on contaminant levels to the west and northwest of Yard 520 is not known and would need to be investigated and quantified prior to selection. It is certain that the assumed 30 years of O&M would be insufficient to protect groundwater quality since CCBs are known to leach contaminants into groundwater for many decades. Any potential for this alternative to succeed would necessarily be predicated on construction of a true cap to replace the current soil cover over Yard 520 and perhaps over other major placement areas.
39. Page 8-27, Section 8.3.10, Groundwater Alternative 6B – The Groundwater Interception-East alternative is subject to all of the same comments as the Groundwater Interception North and East (comment #38) with the additional caveat that this alternative would likely do little to restore groundwater quality to the north or west of Yard 520. The only apparent value to this alternative appears to be to lower construction and O&M costs.
40. Page 9-2, Section 9.2.1, 1st bullet – Inadequacy of the existing final cover is well documented. Infiltration through the cover has resulted in mounded leachate that was observed to be increasing during the RI. This mounded leachate provides the head needed to reverse the hydraulic gradient north of Yard 520 and drive CCB-derived contaminants out of the landfill. None of retained alternatives can be successful at restoring groundwater quality for the necessary timeframe unless the final cover is upgraded to a landfill cap capable of controlling infiltration.
41. Page 9-2, Section 9.2.1, 3rd bullet – The monitoring reports provided in Appendix C should be carefully reviewed to understand the information that they actually provide. The

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Respondents' own reports identify more statistically significant upward than downward trends, and these do not include wells that show upward trends deemed not statistically significant that show concentrations that have more than doubled in some cases. The IDEM administered monitoring program at Yard 520 needs significant revision to reflect known conditions at the site.

42. Page 9-2, Section 9.2.1, 4th bullet – See comment #19.
43. Page 9-2, Section 9.2.1, 5th bullet – See Comment #33.
44. Page 9-2, Section 9.2.1, last paragraph – The comments provided above highlight several reasons that remedial actions are necessary to protect human health and the environment. Continued monitoring would do nothing to restore groundwater quality and, given the Respondents' history of submitting seriously flawed monitoring reports, will be unlikely to be acceptable to the public.
45. Page 9-2, Section 9.2.2 - The timeframe needed for any of the alternatives presented in the FS to comply with chemical ARARs would not be reasonable as is required in RAO 3. Also see comments #16 and 41.
46. Page 9-2, Section 9.2.4 – The only alternatives that have an effect on the toxicity, mobility or volume of CCB-derived contaminants are those that both collect and treat contaminants or those that contain contaminants within the landfill. In order to be effective over the necessary timeframe, any of the alternatives would need to be augmented with an upgraded landfill cap.
47. Page 9-2, Section 9.2.5 – Several of the presented alternatives that include collection and treatment of contaminants or are containment alternatives could be effective over the short-term if appropriately implemented. However, the CCBs disposed in Yard 520 and other areas present a long-term hazard that must be addressed with long-term remedy.
48. Page 9-5, Section 9.3 - The ranking of the alternatives are disappointing but not surprising, and are consistent with the persistent threads permeating this RI/FS effort. The highest ranking alternatives are those that provide no meaningful restoration of groundwater quality and leave the residents of Town of pines with a degraded environment. If the highest ranked alternatives were all that is required by USEPA, we should see no diminution of continuing release of contaminants from CCB deposits. Public acceptance the alternatives scored highest by the Respondents should be expected to be very low.
49. Table 12, Containment – See Comment #20

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50. Table 13, Containment - See Comment #20

51. Table 14, Containment - Closure of Yard 520 included placement of a clayey soil final cover, not an engineered low-permeability cap. This action was done in compliance with Indiana solid waste regulations for closure of a permitted facility, not as a response action. Costs associated with closure of Yard 520 must not be counted as response actions.

52. Table 14, No Further Action – See comment #20.

53. Table 15, Containment – See Comment #20.

54. Table 18 – All of the cost estimates assume a 30-year O&M period. Given the persistent nature of CCB-derived contaminants, these estimates will be insufficient to achieve and maintain restoration of groundwater quality and the attendant threats to the citizens of Town of Pines and to the environment, including IDNL.

References

USEPA, 2010, Human and Ecological Risk Assessment of Coal Combustion Wastes (Draft). Office of Solid Waste and Emergency Response. RIN 2050-AE81.

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APPENDIX

COMMENTS PROVIDED BY
LARRY JENSEN (PINES)

Comments on

Pines FS_Figures_November 29_2012

By Larry Jensen
PINES Group

General Comments

1. Radiation data taken by the responsible parties for the U.S. Environmental Protection Agency Region 5 (USEPA5) Yard 520 site does not appear to have been taken according to the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) protocols. USEPA5 made clear at the November 1, 2012, Northwestern Indiana Regional Planning Commission, Environmental Management Policy Committee, meeting that radiation data must be taken by this protocol. USEPA5's stance would seem to indicate they would not support data taken without adherence to the MARSSIM protocol, as provided in this Feasibility Study.
2. No risk assessment has been made for CCB contaminated surface soils in the Pines.

The calculations made for the Human Health Risk Assessment were: (1) for radioactive soils in uncontaminated areas (background) and (2) for the cleanup criterion in Title 40, Part 192 (40 CFR 192). These did not quantify any risk due to depositions of CCB's in surface soils in the Town of Pines.

The lack of a radiation risk assessment is due to the fact that no soil samples were taken and analyzed in Pines areas shown to contain CCB's.

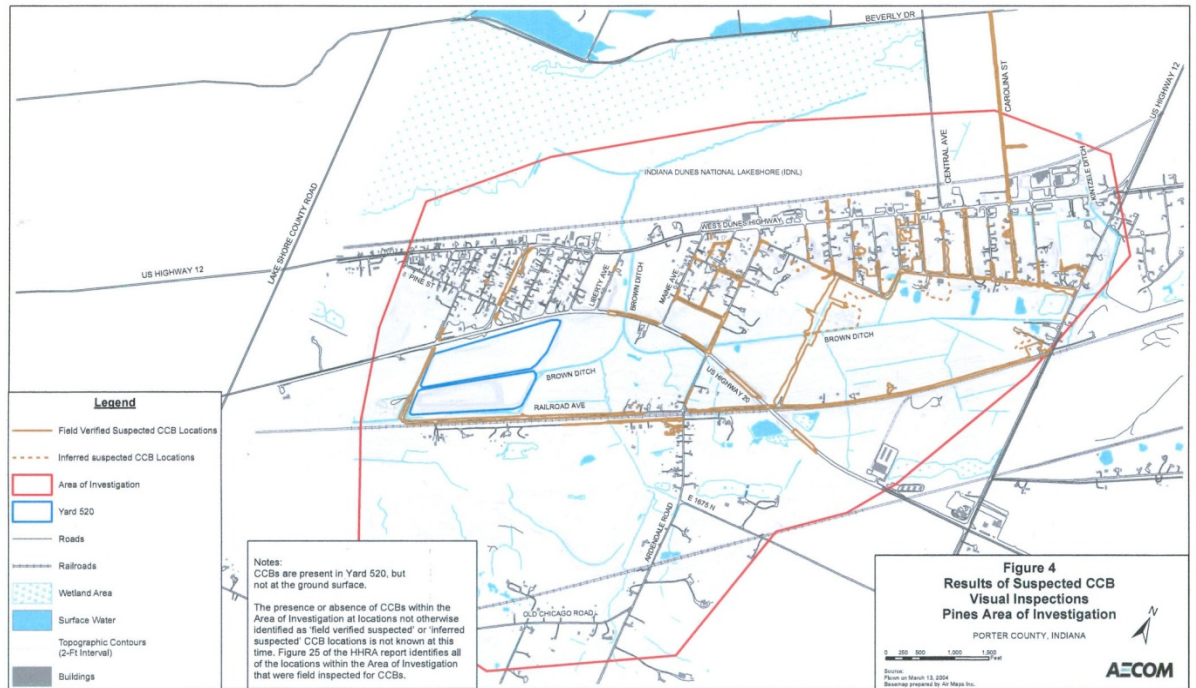
"Soil samples for chemical and radiological analysis were not collected from individual residential properties, and soil samples (possibly including some percentage of CCBs) have not been collected across much of the Pines Area of Investigation."

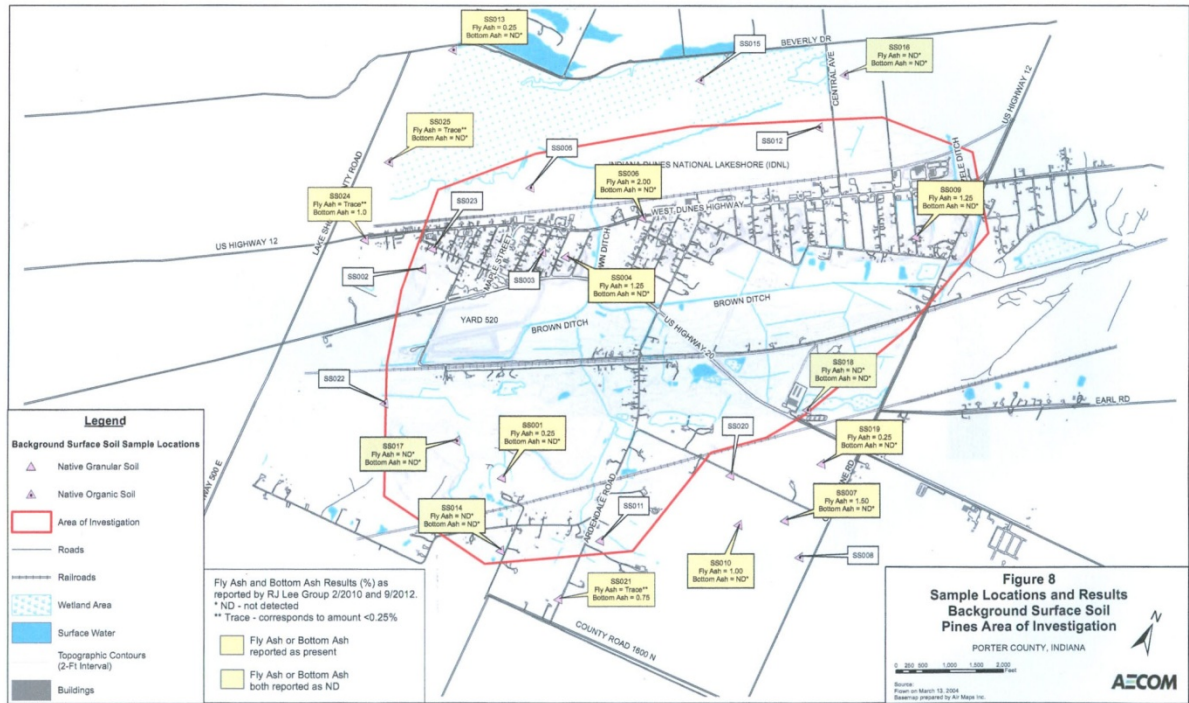
[Attachment A2 to Appendix A - Response to USEPA comments dated August 31, 2012 regarding the Alternatives Screening Technical Memorandum – Item 11]

Although Figure 4 (Results of Suspected CCB Visual Inspections) below shows an extensive distribution of CCB throughout the Town of Pines, the sampled areas as shown in Figure 8 (Sample Locations and Results,

Background Surface Soil) below, with the possible exception of SS009, all appear to be in uncontaminated areas.

No data or maps show surface soil samples were taken in CCB depositions areas as shown in Figure 4.





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3. Soils collected for radiation analyses were taken in a way that may have diluted the concentration.

Radium standards for USEPA radiation cleanups in 40 CFR 192 are based on concentrations of 15 centimeter (6 inch) layers.

Soil samples taken in the Town of Pines were in 12 inch aliquots - See Table 2-10 (Background Surface Soil Analytical Results for Radiological Parameters, Pines Area of Investigation). For example, if the CCB contaminants were only in the top 6 inches of soil and the 6 – 12 inch layer was at background concentration then combining soils from these two layers, 0 -12 inches, would dilute the result. Numerically, for example, if the top layer had a total radium concentration of 7 picocuries per gram (pCi/gm) and the lower layer was at background, 1.596 pCi/gm (page 1244 of FS), then the 12 inch aliquot would have a concentration of 4.298 pCi/gm. The top layer by itself would exceed a cleanup criterion of 6.596 pCi/gm (page 1244 of FS) but the 0 – 12 inch sample would not.

4. The responsible parties have stated (see comment 11 below) that they feel that obtaining additional data on CCB related COC's at the ground surface

of private properties, particularly at residences, and evaluating it is appropriate. They will submit a work plan to collect samples, do laboratory analyses, and evaluate it.

Attachment A1 to Appendix A - Response to USEPA comments dated April 18, 2012 regarding the Remedial Action Objectives Technical Memorandum

Specific Comments

1. See Final RI, Table 2-1, Summary of Samples Analyzed, footnotes

(d) – Total U, lithium, and radionuclides in groundwater were not analyzed after the August 2006 sampling event per USEPA approval (see Appendix E).

(e) – Total U added during the August 2006 sampling event per USEPA approved FCO (see Appendix A).

These omissions delete crucial constituent data pursuant to USEPA Drinking Water Standards, 40 CFR 141.66. Radionuclide data are critical to determining human health risks from groundwater and drinking water.

No radionuclides in groundwater data appear to have been taken since 2006. Data for the present state of groundwater is critical and should be obtained promptly.

2. In the response for item 13,

Prevent the installation of private wells and use of groundwater for drinking in all areas where COC concentrations are greater than background levels that are unaffected by site-related contamination and are associated with risks within and/or above USEPA's target risk range of 1E-06 to 1E-04 and a target endpoint specific hazard index of 1.

This response should recognize USEPA Primary Drinking Water Standards for radionuclides, 40 CFR 141.66, as well as standards for chemicals, and should ensure that all wells, including new ones, meet all standards.

3. The following response from item 13 is very important as it commits the responsible parties to collect data on groundwater for USEPA5 to confirm USEPA 40 CFR 141.66 radiation standards apply subsequent to remediation.

Response: RAO 5 has been revised to read: Restore groundwater to achieve and maintain ARARs, including federal and state drinking water standards and ambient water quality standards, protective levels (corresponding to risks within and/or above USEPA's target risk range of 1E-06 to 1E-04 and a target endpoint specific hazard index of 1) and/or background levels that are unaffected by site related contamination for CCB-related constituents within a timeframe that is reasonable considering practicable response action alternatives.

4. Pursuant to a response in Item 13 which reads:

Reduce or eliminate potential exposure to CCB- and site related COC concentrations at or near the ground surface greater than background levels that are unaffected by site-related contamination and associated with risks within and/or above USEPA's target risk range of 1E-06 to 1E-04 and a target endpoint specific hazard index of 1.

Radioactive materials are COC's and have been found on the ground surface of residential, private, and municipal land in Pines (PINES Group surveys in 2009, 2012) that are statistically distinct from background levels.

The PINES Group did not locate any gamma-ray and X-ray count rate data nor radionuclide soil concentration data for surface CCB deposits in this or any other site-related EPA document. Risk could result from exposure to gamma-rays and X-rays emanating from these soils and further from inhalation, ingestion and pica. The commitment stated in item 13 should apply to the radioactive materials as well.

5. Further, pursuant to a response in Item 13 which reads:

Prevent the installation of private wells and use of groundwater for drinking in all areas where COC concentrations are greater than background levels that are unaffected by site-related contamination and are associated with risks within and/or above USEPA's target risk range of 1E-06 to 1E-04 and a target endpoint specific hazard index of 1.

Federal drinking water standards are an ARAR, which includes radionuclides in 40 CFR 141.66. The commitment above is essential to protect human health.

6. Additionally, pursuant to a response in Item 13 which reads:

Monitor groundwater upgradient and downgradient of CCB fill areas to demonstrate remedial progress and determine when potential beneficial uses of groundwater (drinking and discharge to surface water) are met (i.e., achieving and maintaining ARARs including federal and state drinking water standards and ambient water quality standards, protective levels (corresponding to risks within and/or above USEPA's target risk range of 1E-06 to 1E-04 and a target endpoint specific hazard index of 1) and/or background levels that are unaffected by site-related contamination for CCB-related constituents).

Federal drinking water standards are an ARAR, which includes radionuclides in 40 CFR 141.66. Groundwater monitoring must demonstrate that this ARAR is met for radionuclides as well.

Attachment A2 to Appendix A - Response to USEPA comments dated August 31, 2012 regarding the Alternatives Screening Technical Memorandum

Specific Comments

7. The following statement was made in item 1:

"While there is no information as to the percent CCBs in subsurface soils, the majority of potential

residential exposure is to surface soils."

CCB's appear to be present in subsurface soils, perhaps extensively. A citizen of Pines took the following picture during road work that shows a seam of material, potentially bottom ash, approximately 4 feet thick. Remediation actions must be cognizant of this potential.



It was stated in the Remedial Investigation Report of March 5, 2010, in the Potential Human Receptors Section (page ES-3) that, "Construction workers may potentially contact surface and subsurface CCB's directly via incidental ingestion and dermal contact." It should also be stated that gamma-ray / X-ray exposure may occur.

The Town of Pines is investigating installation of a sewer network. Workers doing this work may encounter radioactive CCB's that could be potentially hazardous.

8. The following statement was made in item 11:

“Soil samples for chemical and radiological analysis were not collected from individual residential properties, and soil samples (possibly including some percentage of CCBs) have not been collected across much of the Pines Area of Investigation.”

This statement acknowledges a major deficiency in this investigation. The PINES Group (People in Need of Environmental Safety) has conducted two gamma-ray surveys of residential, private, and municipal soils in 2009 and 2012. These both clearly showed many areas statistically above background radiation count rate levels. All sites showing above twice background count rates are associated with a black glittery material that seems to have the characteristics of bottom ash. Gamma exposure rates, isotope identification, and soil concentrations have not been measured in affected areas by EPA or EPA-related responsible parties, resulting in deficiencies in the data base and in the risk assessment for residential, private, and municipal properties. Many questions have yet to be addressed:

- a. What are the gamma exposure rates in affected areas in the Pines?
- b. What are the qualitative radiation risks for citizens, workers, and town visitors from exposure to these gamma-ray / X-ray emitting soils?
- c. What are the emitting isotopes in these areas and are they associated with CCBs?
- d. What are the soil concentrations in these areas and do they exceed USEPA criteria such as in 40 CFR 192?
- e. If properties are backfilled with these materials are radon levels elevated in homes or buildings?
- f. What are the radiation levels in Pines drinking water, per 40 CFR 141.66?

- g. What are the numerical radiation risks associated with gamma-ray / X-ray emitting soils?

9. The following statement was made in item 17:

Six years of available data indicate that the current extent of CCB-related COCs in groundwater is contained. However, the containment option may be effective at reducing possible future migration and, potentially, reducing the extent of the impacted area.

As noted above in comment 1 from the Final RI, all radionuclide sampling in groundwater was terminated in 2006. No radionuclide data is available to confirm or refute the statement that “CCB-related COCs in groundwater is contained.”

10. The following statement was made in item 23:

Response: While there is certainly precedence for removal actions on residential properties at other CERCLA sites, it is important to also consider the risk assessment context of such sites and the target risk levels used to make those specific remedial decisions. The following sentence was added to the first bullet:

Removal at selective locations with CCBs is potentially feasible (e.g., residential yards, schools, churches, and playgrounds), where it is demonstrated to be warranted.

A new second bullet as added as follows:

An option associated with institutional controls would be to require the removal of CCBs beneath roads or portions of roads (i.e., utility trenches) and replacement with clean fill as part of maintenance activities.

Removal actions for radioactive materials have been used by USEPA Region 5 many times and are not only feasible but implementation is well understood. The problem in Pines is that data has not been collected to determine if the risk associated with these materials would lead to such action being warranted. Moreover, without attention to this issue citizens and municipal workers may be adversely affected through inadvertent exposure or intrusion. Most worrisome at this time is the potential extension of municipal sewers from Michigan City into Pines with the potential for unnecessary and adverse exposure of workers.

11. Comment 30 states:

Section 6.2.4 Alternative 4 and Additional Data Evaluation and Review and Table 9, page 2 first row. Section 6.2.4 and the corresponding row of Table 9 discuss the need for obtaining additional data and evaluating it before

providing an analysis of potential options regarding CCB-related COCs at the ground surface. At this time, based on the data, this seems appropriate. This further supports the idea presented above of separating alternatives into two groups (groundwater and surficial soils / sediments). Given additional data are going to be collected, some data from the surface soils of private properties, particularly those of residences or other sensitive receptors, should be strongly considered...

Response: The Respondents will submit a work plan for the collection and evaluation by particulate matter analysis followed by analytical chemistry, where warranted, of additional background soil samples. This work will involve renewal or acquisition of new access agreements, sample collection, laboratory analysis, data validation, and data evaluation...

The data submitted to USEPA5 by the PINES Group in 2009 and 2012 on radioactive count rate measurements would seem to indicate a need to additional sampling as discussed in the above quote.

No data has been collected by the responsible parties on the identity of radionuclides, their exposure rate, and their concentration in Pines soils where CCB's were identified. As a result the Human Health Risk Assessment issued by the responsible parties does not calculate the risk from radioactive materials. It calculates the risk from background radionuclides (non-contaminants) and from the cleanup criterion, nothing more. With no data collected from CCB areas, a quantitative risk for contaminated soils cannot be computed.

12. OCTOBER 2011 GROUNDWATER MONITORING REPORT Yard 520 RWS Pines, Indiana

These reports do not include radionuclides. Since USEPA has standards for drinking water in 40 CFR 141.66 this is a significant oversight.

Appendix E

13. Evaluation of Background Soils Data

This discussion indicates that surface soil samples collected were from background areas, not areas that showed the presence of CCB's.

14. Radionuclide HHRA

Table 4 shows only background data, not data for CCB depositions. Table 5 shows risks associated with background and a cleanup criterion. This section does not evaluate risk from CCB deposition sites in Pines although Figure 4 (see General Comment 2 above)

shows visual examinations which show such deposits are extensive. An HHRA for radionuclides must show the risks associated with depositions of CCB in the surface soils of Pines.